



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/679,514	10/06/2000	Hung-Jen Hsu	TS2000-166	8850

28112 7590 04/01/2003

GEORGE O. SAILE & ASSOCIATES
28 DAVIS AVENUE
POUGHKEEPSIE, NY 12603

EXAMINER

KEBEDE, BROOK

ART UNIT	PAPER NUMBER
----------	--------------

2823

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/679,514

Applicant(s)

HSU ET AL.

Examiner

Brook Kebede

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-20 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-8 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' admitted prior art (Figs. 1-4) in view of Blalock (US/5,320,981).

The rejection that was set forth in Paper No. 6 is maintained and repeated herein below as record.

Re claim 1, Applicants' admitted prior art teaches a method to form passivation openings that prevent protective tape residue in the manufacture of an integrated circuit device comprising: providing a semiconductor substrate (20); depositing a passivation layer (28) overlying said semiconductor substrate (20); depositing an organic photoresist layer (32)

Art Unit: 2823

overlying said passivation layer (28); patterning said organic photoresist layer (32) to expose said passivation layer (28) in areas where said passivation openings (not labeled) are planned; etching through said passivation layer (28) not covered by said organic photoresist layer; stripping away said organic photoresist layer (32); applying a protective tape (40 44) overlying said passivation layer (28) and said passivation openings (not labeled); and removing said protective tape (40 44). However, Applicants' admitted prior art does not teach reflowing said organic photoresist layer to create gradually sloping sidewalls on said organic photoresist layer; etching through said passivation layer not covered by said organic photoresist layer to form said passivation openings with gradually sloping sidewalls; wherein said gradually sloping sidewalls on said passivation openings allow said protective tape to be completely removed without leaving adhesive residue in the manufacture of the integrated circuit device.

Blalock teaches a well-known method of reflowing of organic photoresist layer to create gradually sloping sidewalls on the organic photoresist layer; etching through the passivation layer not covered by said organic photoresist layer to form said passivation openings with gradually sloping sidewalls (see Figs. 1-3 and Col. 2, lines 16-30). Given the Blalock teachings one of ordinary skill would have motivated to reflowing said organic photoresist layer to create gradually sloping sidewalls on said organic photoresist layer; etching through said passivation layer not covered by said organic photoresist layer in order to form said passivation openings with gradually sloping sidewalls (see Col. 2, lines 16-30).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Applicants' admitted prior art reference with method of reflowing of organic photoresist layer to create gradually sloping

Art Unit: 2823

sidewalls on the organic photoresist layer and etching through the passivation layer not covered by said organic photoresist layer to form said passivation openings with gradually sloping sidewalls as taught by Blalock because the method would have provided an etching profile of gradually sloping sidewalls of the passivation layer that would have been utilized in the proceeding process.

Re claim 2, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation wherein said passivation layer comprises silicon nitride (see Fig. 2 of admitted prior art).

Re claim 3, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation wherein said passivation layer is deposited to at certain thickness. Furthermore, the thickness range of the passivation layer between about 3,000 Angstroms and 15,000 Angstroms would have been achieved within the level of ordinary skill in the art by routine optimization. Generally, differences in concentration or temperature thickness of a layer will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature or the desired thickness is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure

Art Unit: 2823

of either the critical nature of the claimed thickness range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919, f.2d 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

Re claim 4, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation depositing of organic photoresist layer is deposited at certain thickness. Furthermore, the thickness range of the passivation layer between about 10,000 Angstroms and 50,000 Angstroms would have been achieved within the level of ordinary skill in the art by routine optimization. Generally, differences in concentration or temperature thickness of a layer will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature or the desired thickness is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed thickness range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919, f.2d 1575, 1578, 16 USPQ2d, 1936 (Fed. Cir. 1990).

Re claim 6, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation wherein said step of etching through said passivation layer comprises a dry plasma etching process using an etching chemistry comprising CF₄ and O₂ gases (see Figs. 1-4 of Applicants' admitted prior art).

Re claim 7, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation wherein said step of removing said protective tape is by use of a peeling tape (see Fig. 3 of Applicants' admitted prior art).

Re claim 8, as applied to claim 1 above, both Applicants' admitted prior art and Blalock teach all the claimed limitations including the limitation further comprising grinding the backside of said semiconductor substrate after said step of applying said protective tape and prior to said step of removing said protective tape (see Fig. 3 of Applicants' admitted prior art).

Allowable Subject Matter

3. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. Claims 9-20 are allowed over prior art of record.

5. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither anticipates nor renders obvious the claimed subject matter of the instant application as a whole either taken alone or in combination, in particular, prior art of record does not teach "reflowing said organic photoresist layer to create gradually sloping sidewalls on said organic photoresist layer wherein said reflowing is performed at a temperature

Art Unit: 2823

of between 140 degrees C and 200 degrees C for duration of between 3 minutes and 15 minutes,” as recited claims 9 and 16 respectively.

Claims 10-15 and 17-20 are also allowed as being dependent of the allowed independent base claim.

Response to Arguments

6. Applicants' arguments filed on October 21, 2002, i.e., with respect to claims 1-8, have been fully considered but they are not persuasive.

Applicants argued that “Applicant agrees that Blalock discloses a method to form sloping walls on the openings in a photoresist layer. However, Applicant notes that the dry etch process disclosed by Blalock etches both the photoresist layer and the substrate at the same time in order to replicate the sloped profile in the substrate (Col. 2, lines 22-25). By comparison, Applicant's method only etches the underlying passivation layer 68 but not the photoresist layer 72 (page. 12, Fig. 8). It does not appear that the sidewall slope, patterning method disclosed in Blalock is the same as that disclosed by the Applicant. It is further noted that Figs. 1-3 of Blalock do not correspond to the above described sidewall method. Rather, Figs. 1-3 of Blalock correspond to a completely different method used to facet the edges of a dielectric layer 14. Since the patterning method disclosed in Blalock is not the same as that disclosed by the Applicant, Applicant's Claim 1 should be in, condition for allowance...”

In response to the applicants' argument, the Examiner respectfully submits that such an argument is not commensurate with the scope of the claims, in particularly, as stated above. The Examiner respectfully submits that the combination of Applicants' admitted prior art (Figs. 1-4) and Blalock '981 teach all the claimed limitation as applied in Paragraph 2 herein above. In

Art Unit: 2823

addition, the Examiner respectfully submits that the rejected claim, i.e., claim 1, does not recite what kind of etching method is employed. Therefore, applicants argument that “*notes that the dry etch process disclosed by Blalock etches both the photoresist layer and the substrate at the same time in order to replicate the sloped profile in the substrate (Col. 2, lines 22-25). By comparison, Applicant's method only etches the underlying passivation layer 68 but not the photoresist layer 72 (page. 12, Fig. 8). It does not appear that the sidewall slope...*” has no merit because the rejected claim does not specifically claimed the type of etching method utilized in the claimed invention of instant application. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Finally, in response to applicants’ arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Therefore, the *prima facie* case of obviousness has been met and the rejection under 35 U.S.C. § 103 is deemed proper.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 2823

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Correspondence


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede


March 26, 2003


Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800